

**Amendments to the Claims**

This listing of claims will replace all prior version and listings of claims in the application:

**Listing of Claims:**

1. (Currently amended): A method for discriminating an agent, comprising the steps of:
  - (a) constructing a decision tree having a plurality of branches, each branch corresponding to at least one defined action, wherein each branch comprises a plurality of successive branches, each successive branch corresponding to the at least one defined action;
  - (b) providing a conditioned environment sensitive to the agent;
  - (c) obtaining data from response of the agent to the conditioned environment;
  - (d) extracting features from the obtained data;
  - (e) selecting a branch from the decision tree corresponding to the features;
  - (f) performing on the features the at least one defined action corresponding to the branch;
  - (g) producing a classification of the agent; and
  - (h) iteratively repeating steps of (d)-(g) until the agent is discriminated; and
  - (i) storing the classification of the agent for use.
2. (Withdrawn): The method of claim 1, wherein the agent comprises a chemical agent.
3. (Withdrawn): The method of claim 1, wherein the agent comprises a non-chemical agent.
4. (Original): The method of claim 1, wherein the agent comprises a biological agent.
5. (Withdrawn): The method of claim 1, wherein the agent comprises a non-biological agent.

6. (Original): The method of claim 1, wherein the constructing step comprises the step of choosing logic for successive refinement of agent classification.
7. (Withdrawn): The method of claim 6, wherein the choosing step comprises the step of selecting logic for classification of a Neuro agent.
8. (Currently amended): The method of claim 6, wherein the choosing step comprises the step of selecting logic for classification of a viral Viral agent.
9. (Original): The method of claim 1, wherein the providing step comprises the step of selecting of cell types to be exposed to the agent.
10. (Original): The method of claim 9, wherein the providing step further comprises the step of placing at least one cell of the selected cell types in the conditioned environment.
11. (Withdrawn): The method of claim 1, wherein the providing step comprises the step of selecting of reagent quantities.
12. (Withdrawn): The method of claim 1, wherein the providing step comprises the step of selecting of a desired assay.
13. (Original): The method of claim 1, wherein the selecting step comprises the step of selecting of a branch corresponding to at least one desired feature extraction algorithm from at least one library of algorithms.
14. (Currently amended): The method of claim 1, wherein the producing step comprises the steps of:
  - (a) a: determining a classification method from a library of classification methods; and
  - (b) b: applying the classification method to the features to produce the classification.

15. (Withdrawn): A system for discriminating an agent, comprising:
  - a. means for constructing a decision tree having a plurality of branches, each branch corresponding to at least one defined action, wherein each branch comprises a plurality of successive branches, each successive branch corresponding to at least one defined action;
  - b. a conditioned environment sensitive to the agent;
  - c. means for obtaining data from response of the agent to the conditioned environment;
  - d. means for extracting features from the obtained data;
  - e. means for selecting a branch from the decision tree corresponding to the features;
  - f. means for performing on the features at least one defined action corresponding to the branch;
  - g. means for producing a classification of the agent; and
  - h. means for iteratively repeating certain tasks until the agent is discriminated.
16. (Withdrawn): The system of claim 15, wherein the agent comprises a chemical agent.
17. (Withdrawn): The system of claim 15, wherein the agent comprises a non-chemical agent.
18. (Withdrawn): The system of claim 15, wherein the agent comprises a biological agent.
19. (Withdrawn): The system of claim 15, wherein the agent comprises a non-biological agent.
20. (Withdrawn): The system of claim 15, wherein the constructing means comprises means for choosing logic for successive refinement of agent classification.
21. (Withdrawn): The system of claim 20, wherein the choosing means comprises means for selecting logic for classification of a Neuro agent.

22. (Withdrawn): The system of claim 7, wherein the choosing means comprises means for selecting logic for classification of a viral agent.
23. (Withdrawn): The system of claim 15, wherein the conditioned environment comprises a plurality of cells to be exposed to the agent.
24. (Withdrawn): The system of claim 15, wherein the conditioned environment comprises a plurality of reagent quantities.
25. (Withdrawn): The system of claim 15, wherein the conditioned environment comprises a plurality of a desired assay.
26. (Withdrawn): The system of claim 15, wherein the selecting means comprises means for selecting of a branch corresponding to at least one desired feature extraction algorithm from at least one library of algorithms.
27. (Withdrawn): The system of claim 15, wherein the producing means comprises a controller performing the steps of:
  - a. determining a classification method from a library of classification methods; and
  - b. applying the classification method to the features to produce the classification.
28. (Currently amended): A method for discriminating an agent, comprising the steps of:
  - (a)a: providing a plurality of L parameters, L being an integer, each parameter being related to the status of the agent;
  - (b)b: fitting the plurality of L parameters into a set of i<sup>th</sup> order differential equations, i = 1, . . . , N, N being an integer;
  - (c)c: obtaining a plurality of L features corresponding to L parameters, respectively, from the set of i<sup>th</sup> order differential equations;
  - (d)d: separating the L features into a plurality of classes with a corresponding

confidence level;

(e) providing a plurality of L+1 parameters, each parameter being related to the status of the agent;

(f) fitting the plurality of L+1 parameters into a set of ith+1 order differential equations;

(g) obtaining a plurality of L+1 features corresponding to L+1 parameters, respectively, from the set of ith+1 order differential equations;

(h) separating the L+1 features into a plurality of classes with a corresponding confidence level; **and**

(i) iteratively repeating steps (e)-(h) until a plurality of classes for the agent is separated with a desired corresponding confidence level; **and**

(j) storing the plurality of classes for the agent for use.

29. (Withdrawn): The method of claim 28, wherein the agent comprises a chemical agent.

30. (Withdrawn): The method of claim 28, wherein the agent comprises a non-chemical agent.

31. (Original): The method of claim 28, wherein the agent comprises a biological agent.

32. (Withdrawn): The method of claim 28, wherein the agent comprises a non-biological agent.

33. (Original): The method of claim 28, wherein the parameters comprises a plurality of measurable physical quantities.

34. (Original): The method of claim 33, wherein the plurality of measurable physical quantities comprises measurable physical quantities related to metabolic status of a biological agent.

35. (Original): The method of claim 28, wherein the set of ith order differential equations comprises a set of 1st order differential equations of metabolic pathways, signaling pathways, or gene expression interactions.
36. (Original): The method of claim 35, wherein the set of ith+1 order differential equations comprises a set of 2nd order differential equations of metabolic pathways, signaling pathways, or gene expression interactions.
37. (Original): The method of claim 28, wherein each of the separating steps (d) and (h) comprises the step of separating corresponding features into a plurality of classes with one of a Principal-Component-Analysis/Cluster separation and a singular value decomposition.
38. (Withdrawn): A system for discriminating an agent, comprising a controller performing the steps of:
  - a. providing a plurality of L parameters, L being an integer, each parameter being related to the status of the agent;
  - b. fitting the plurality of L parameters into a set of ith order differential equations,  $i = 1, \dots, N$ ;
  - c. obtaining a plurality of L features corresponding to L parameters, respectively, from the set of ith order differential equations;
  - d. separating the L features into a plurality of classes with a corresponding confidence level;
  - e. providing a plurality of L+1 parameters, each parameter being related to the status of the agent;
  - f. fitting the plurality of L+1 parameters into a set of ith+1 order differential equations;
  - g. obtaining a plurality of L+1 features corresponding to L+1 parameters, respectively, from the set of ith+1 order differential equations;
  - h. separating the L+1 features into a plurality of classes with a corresponding

confidence level; and

- i. iteratively repeating steps (c)-(h) until a plurality of classes for the agent is separated with a desired corresponding confidence level.

39. (Withdrawn): The system of claim 38, wherein the agent comprises a chemical agent.

40. (Withdrawn): The system of claim 38, wherein the agent comprises a non-chemical agent.

41. (Withdrawn): The system of claim 38, wherein the agent comprises a biological agent.

42. (Withdrawn): The system of claim 38, wherein the agent comprises a non-biological agent.

43. (Withdrawn): The system of claim 38, wherein the parameters comprises a plurality of measurable physical quantities.

44. (Withdrawn): The system of claim 43, wherein the plurality of measurable physical quantities comprises measurable physical quantities related to metabolic status of a biological agent.

45. (Withdrawn): The system of claim 38, wherein the set of  $i$ th order differential equations comprises a set of 1st order differential equations of metabolic pathways, signaling pathways, or gene expression interactions.

46. (Withdrawn): The system of claim 45, wherein the set of  $i$ th+1 order differential equations comprises a set of 2nd order differential equations of metabolic pathways, signaling pathways, or gene expression interactions.

47. (Withdrawn): The system of claim 38, wherein each of the separating steps (d) and (h)

comprises the step of separating corresponding features into a plurality of classes with one of a Principal-Component-Analysis/Cluster separation and a singular value composition.

48. (Currently amended): A method for discriminating an agent, comprising the steps of:
  - (a)a. providing a broad spectrum assay having a plurality of L cell lines, L being an integer, each cell line being able to respond to the agent;
  - (b)b. measuring responses of cell line i, i = 1, . . . , L, to the agent;
  - (c)c. separating the responses into class m, m = 1, . . . , O, O being an integer and the total number of available classes, with a corresponding robustness factor;
  - (d)d. selecting cell line j, j = 1, . . . , L but ≠ i, from the knowledge of class m;
  - (e)e. measuring responses of cell line j, j = 1, . . . , L but ≠ i, to the agent;
  - (f)f. defining a set of feature extraction algorithms from the measured response of cell line j, j = 1, . . . , L but ≠ i;
  - (g)g. selecting cell line k, k = 1, . . . , L but ≠ i and ≠ j;
  - (h)h. measuring responses of cell line k, k = 1, . . . , L but ≠ i and ≠ j, to the agent;
  - (i)i. separating the responses into class n, n = 1, . . . , O, O being an integer and the total number of available classes, with a corresponding robustness factor; **and**
  - (j)j. iteratively repeating steps (f)-(i) until a class for the agent with a desired robustness factor is obtained; **and**
  - (k) storing the obtained class for the agent for use.
49. (Withdrawn): The method of claim 48, wherein the agent comprises a chemical agent.
50. (Withdrawn): The method of claim 48, wherein the agent comprises a non-chemical agent.
51. (Original): The method of claim 48, wherein the agent comprises a biological agent.
52. (Withdrawn): The method of claim 48, wherein the agent comprises a non-biological

agent.

53. (Original): The method of claim 48, wherein each of the separating steps (c) and (i) comprises the step of discriminating the responses with a Maximum Likelihood Estimator.
54. (Original): The method of claim 48, wherein the selecting step (d) comprises the step of selecting the cell line according to a desired sensitivity of the cell line.
55. (Original): The method of claim 48, wherein the defining step (f) comprises the step of using a classifier to define a set of feature extraction algorithms from the measured response.
56. (Original): The method of claim 55, wherein the classifier comprises a threshold.
57. (Withdrawn): A system for discriminating an agent, comprising a controller performing the steps of:
  - a. providing a broad spectrum assay having a plurality of L cell lines, L being an integer, each cell line being able to respond to the agent;
  - b. measuring responses of cell line i, i = 1, . . . , L, to the agent;
  - c. separating the responses into class m, m = 1, . . . , O, O being an integer and the total number of available classes, with a corresponding robustness factor;
  - d. selecting cell line j, j = 1, . . . , L but  $\neq$  i, from the knowledge of class m;
  - e. measuring responses of cell line j, j = 1, . . . , K but  $\neq$  i, to the agent;
  - f. defining a set of feature extraction algorithms from the measured response of cell line j, j = 1, . . . , L but  $\neq$  i;
  - g. selecting cell line k, k = 1, . . . , L but  $\neq$  i and  $\neq$  j;
  - h. measuring responses of cell line k, k = 1, . . . , L but  $\neq$  i and  $\neq$  j, to the agent;
  - i. separating the responses into class n, n = 1, . . . , O, O being an integer and the total number of available classes, with a corresponding robustness factor; and

- j. iteratively repeating steps (f)-(i) until a class for the agent with a desired robustness factor is obtained.

58. (Withdrawn): The system of claim 57, wherein the agent comprises a chemical agent.

59. (Withdrawn): The system of claim 57, wherein the agent comprises a non-chemical agent.

60. (Withdrawn): The system of claim 57, wherein the agent comprises a biological agent.

61. (Withdrawn): The system of claim 57, wherein the agent comprises a non-biological agent.

62. (Withdrawn): The system of claim 57, wherein each of the separating steps (c) and (i) comprises the step of discriminating the responses with a Maximum Likelihood Estimator.

63. (Withdrawn): The system of claim 57, wherein the selecting step (d) comprises the step of selecting the cell line according to a desired sensitivity of the cell line.

64. (Withdrawn): The system of claim 57, wherein the defining step (f) comprises the step of using a classifier to define a set of feature extraction algorithms from the measured response.

65. (Withdrawn): The system of claim 64, wherein the classifier comprises a threshold.